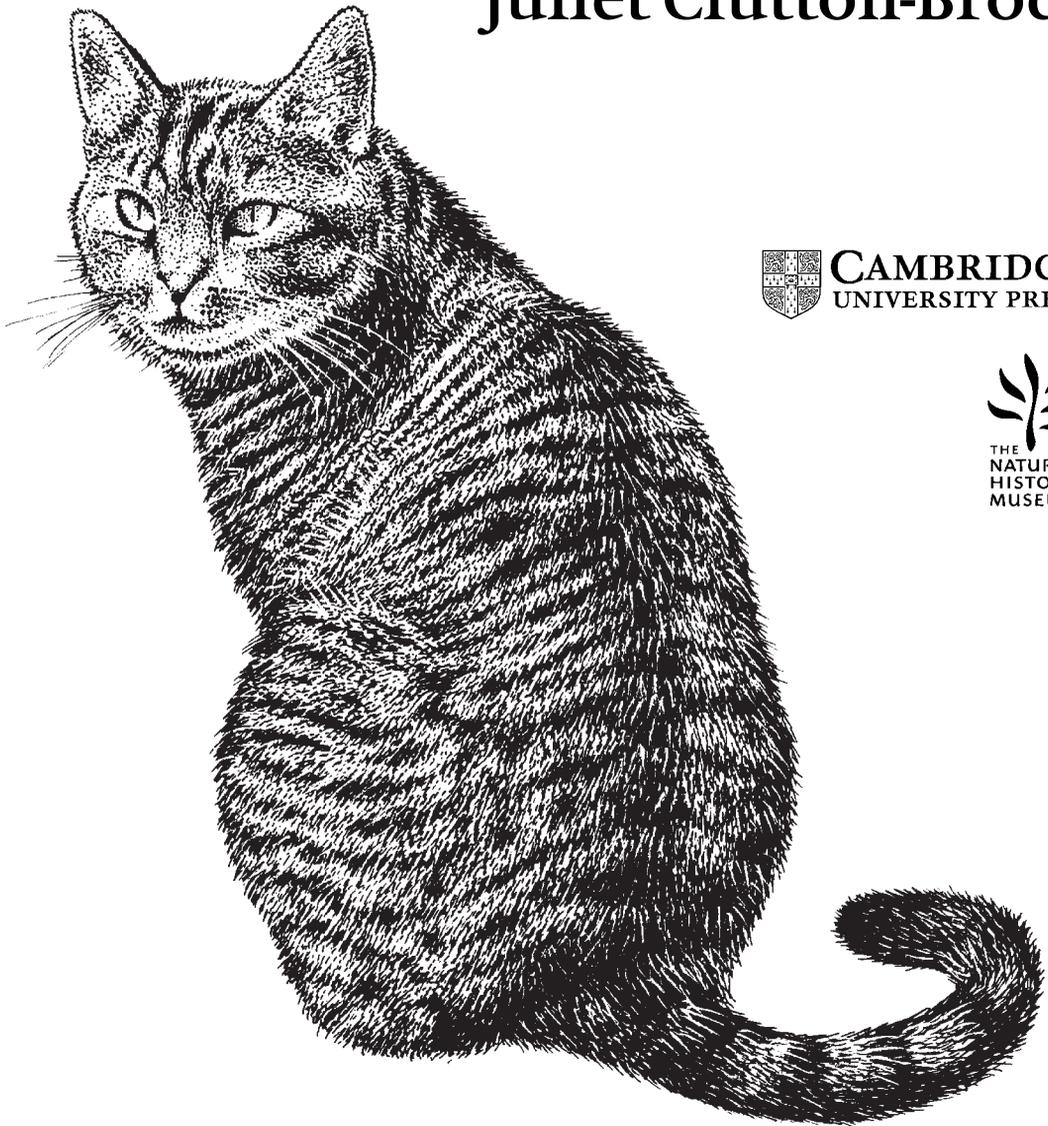


SECOND EDITION

A Natural History of Domesticated Mammals

Juliet Clutton-Brock



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The meat supply of hunter-gatherers

No one would deny that goats, sheep, cattle, pigs, and horses are supremely successful domestic animals and that human populations in most parts of the world have relied on them for some thousands of years, that is in broad terms since the Neolithic period, around 9000 years ago. What archaeologists and biologists do argue about is why, how, and where this domestication first occurred. They also argue about whether, in the earlier periods, the late Palaeolithic and Mesolithic human hunters followed their prey in a catch-as-catch-can manner as do other carnivores such as the lion or the wolf, or whether wild ungulates were herded, tamed, followed, or in any other way consciously managed. To mention briefly one such discussion, it is often claimed that some examples of Upper Palaeolithic art show European horses wearing some kind of harness. There has been controversy on this question since Piette (1906) published his belief that the markings on the little carved head from the cave of St-Michel d'Arudy in the Pyrenees were supposed to represent a rope bridle (Fig. 1.1). The evidence for this bridle is, however, really very insubstantial and it is just as likely that the markings on this carved head, which is less than 5 cm in length, represent the lines of the muscles and lie of the hair in summer coat, as shown in a living horse (Fig. 1.2). The so-called rope nose-band could equally well demarcate the contrasting light-coloured muzzle that is still characteristic of both the Przewalski horse and the unimproved ponies of today.

Whether or not Palaeolithic and Mesolithic people herded or managed the ungulates that they killed for food, there is no doubt that certain species were as important to these early societies as our domestic livestock are today. The relationships of humans with a selection of these ungulates, some of which have remained as hunters' spoil until the present day, are discussed below.

The organic remains that are found in the excavations of early prehistoric sites show that humans ate a great variety of foods, from the meat of wild cattle, to hedgehogs, foxes, nuts, and seeds. The Mesolithic, in particular, was a period that is described as having an economy based on a broad spectrum of



FIGURE 1.1. Ivory carving of a horse's head, St-Michel d'Arudy, Pyrenees (photo Jean Vertut).



FIGURE 1.2. Head of a living Przewalski horse in summer coat (photo Geoffrey Kinns).

foods, but very often excavation reveals that one or two species of large mammal predominated as the primary source of meat. Throughout Europe these were the red deer and the wild boar, in western Asia the gazelle and in some places the wild goat and onager, whilst in North America it was the bison.

The red deer, *Cervus elaphus*

Family Cervidae

From the huge numbers of bones and teeth of red deer that are excavated it seems that this species supplied human populations with an abundant supply of meat and raw materials for at least 5000 years in northern Europe whilst in the southern latitudes where the climate was warmer red deer predominated for perhaps 50 000 years. Figure 1.3 shows the results of a survey made by Jarman (1972) of 165 sites of late Palaeolithic and Mesolithic age throughout Europe and it can be seen that red deer remains were found on more than 95 per cent of the sites. It can therefore be accepted that this species was of prime importance to the hunter-gatherers of the early Holocene in Europe; not only did the animals supply meat, hides, bone and sinew, but deer possess a unique physical structure that was of the greatest value, as a raw material to early cultures, this being antler (Figs. 1.4 and 1.6).

The males of all the forty or so living species of deer carry

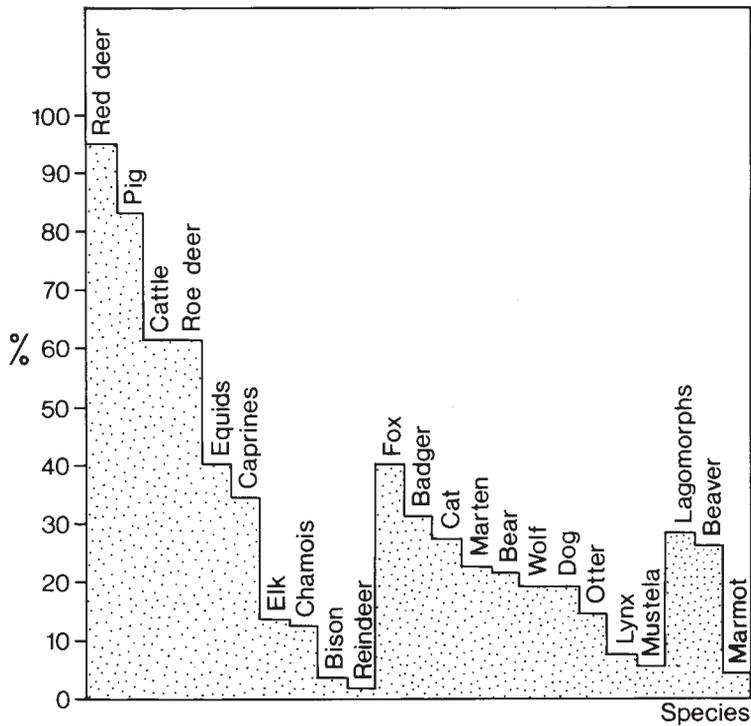


FIGURE 1.3. The presence of animals at 165 late Palaeolithic and Mesolithic sites, expressed as percentages (from Jarman, 1972).

antlers, except for the Chinese water deer, *Hydropotes inermis*, and the musk deer, *Moschus moschiferus*. The reindeer is the only species in which the females also regularly have antlers. No other group of mammals possesses antlers, which differ from horns in that they consist of solid bone and are shed and regrown every year. Many artiodactyls have horns which consist of a keratinous sheath overlying a bone core that is a permanent outgrowth from the frontal bones of the skull. Antlers, on the other hand, are solid bone without a sheath, and they are cast each year from the pedicles which are short protuberances, again from the frontal bones. Antler is the fastest growing animal tissue in existence and it must be surely one of the most amazing facts of life that the enormous antlers of the extinct giant deer, *Megaloceros giganteus*, were cast and regrown every year of the stag's adult life (Fig. 1.5). The growth of the antlers of even the European red deer is amazing enough.

In northern Europe, in the red deer, the old antlers are cast or shed in early spring and new ones begin to grow at once. At first, and until they are fully grown, the antlers are covered with a layer of skin and hair called the velvet, and the bone is well



supplied with blood vessels. The antlers are fully grown in about August and then the velvet wears off in long strips and shreds of dead skin. The stags should now be in prime condition and are ready for the rut or mating season. At the present day as soon as the antlers are shed, after the rut, the deer will chew and gnaw at them, actually consuming the greater part of the bone, presumably in order to replace the valuable minerals that they are losing from their bodies. It is not known, however, whether deer needed to eat their antlers in this way in the prehistoric environment where the soil may have contained a much higher mineral content than it does today and the food plants would have been much more abundant. What is known is that the human populations who depended on the deer for their livelihood collected

FIGURE 1.4. Red deer, *Cervus elaphus*. Stag with fully grown antlers (photo Geoffrey Kinns).



FIGURE 1.5. Antlers of the extinct giant deer, *Megaloceros giganteus*, 3 metres across (photo The NHM).

the shed antlers in vast numbers. Maybe they followed the groups of stags and snatched up the antlers as soon as they fell, which would not be a difficult task because, as red deer are territorial in their behaviour, they will drop their antlers in more or less the same places each year. On the other hand if the deer did not chew them they could presumably be collected in a more random way whenever they were found lying on the ground.

Antler differs from the limb bones of mammals in that it is solid right through. There is an outer layer of compact bone and this covers a spongy, or trabecular matrix, thereby providing a structure that is extraordinarily strong and yet at the same time very resilient. It is for this reason that antler was one of the most important raw materials of the pre-metal ages. When the crown of an antler of a red deer is removed, it makes one of the most efficient digging tools in the world and although it may not be as long lasting as a metal pick it is quick to make, light to use, and is easily replaced (Fig. 1.6). Another common use for antler, especially on the continent of Europe, was for hafting stone axes, as shown in Figure 1.7.

With an abundance of food and the excellent raw materials of wood, bone, flint, and antler it is difficult to see what the Mesolithic people of Europe lacked. It is therefore worth speculating why this economy was displaced so dramatically by agriculturalists who brought with them imported domesticated sheep and goats, animals that were foreign to Europe and did not survive well in forested areas. What was so special about sheep and goats, which do not even have antlers, and why were the red deer not domesticated and bred to produce docile animals that could be milked?

As explained briefly in the next chapter, it is a question of the

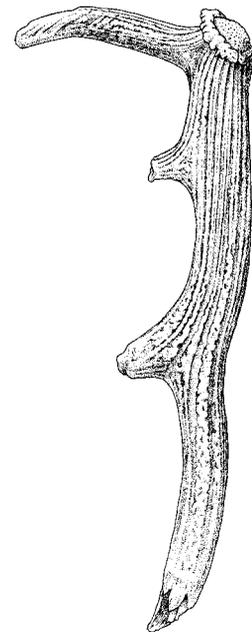


FIGURE 1.6. Antler pick from the Neolithic flint mines of Grime's Graves, Norfolk, England.

behavioural patterns of the different groups of mammals. It is just not possible to impress upon adult red deer that they are a part of human society which is in effect what has been achieved with all the species of true domestic mammals. As with any animal it is of course possible to keep and breed deer in captivity and the modern methods of overcoming the difficulties of managing red deer are reviewed in outline in Chapter 18.

Those who argue, as did Jarman (1972), that the Mesolithic peoples of Europe actively managed the herds of red deer, selectively culling the males and even husbanding the herds, may forget that the numbers of the deer must have enormously outnumbered those of the humans. The forests must have been teeming with wild life and it would require only as much effort as it takes a pack of wolves to kill a wapiti in Canada today, for a group of human hunters to kill a deer. This does not imply that the humans were not thoughtful people, as intelligent as we are today, able to plan ahead, and with traditions and rituals of equal complexity, but in a balanced ecosystem it is unnecessary for a predator, either human or animal, to interfere with the way of life of its prey. In human society this only occurs when the numbers of the prey species become dangerously low and when this happens the dominance hierarchy takes over and the élite forbid the killing of the animals by the common people. This is what occurred, for example, throughout northern Europe in the Medieval period when the Laws of Venery were set up and the cruellest punishments were inflicted on those caught poaching. It is very well known how in the time of William the Conqueror anyone caught killing a hart or a hind was blinded by order of the king. But this sort of control requires a highly sophisticated form of government and it would not apply to bands of hunter-gatherers living perhaps rather as the !Kung San in the Kalahari desert do today, but of course in a cold climate. Such people would kill whatever they could whenever they could, although they might prefer male animals to females, for the sake of their horns or antlers.

As far as predator-prey relationships were concerned in the human context it seems clear that at the close of the Mesolithic period the ecosystem was no longer balanced. There is still much to learn about the environment at this period but it is known that the climate was changing, the forests were being cleared by humans, and the domestic dog was a new aid in the slaughter of large numbers of animals and probably greatly increased their over-hunting. The practice of agriculture was beginning to spread and, far from the herd management of red

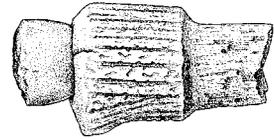


FIGURE 1.7. Polished stone axe in antler sleeve, Neolithic lake village, Switzerland.

deer, what became essential was to keep them off the growing crops and drive them into the forests. In northern Europe pigs and cattle, perhaps often domesticated from local stocks of *Sus scrofa* and *Bos primigenius*, may have slightly preceded the imported sheep and goats which came from the Near and Middle East. The use of pottery and the storage of food, both plant and animal, became widespread and human cultural systems were transformed. Red deer could not adapt to this new way of life and so have remained as wild creatures that have been the sport of kings until the present day, when renewed efforts are being made to turn them into 'farm animals'.

Myotragus balearicus

Family Bovidae, Subfamily Caprinae, Tribe Rupicaprini

A little-known example of the replacement of wild hunted animals by imported domestic livestock occurred in the Balearic islands in the Mediterranean. It concerns the extinct goat-like mammal, *Myotragus balearicus*, which was originally believed to have become extinct in the late Pleistocene on Majorca and Minorca, the only islands from which its remains have been identified with certainty (Fig. 1.8). This strange animal has no common name; it was called the 'cave goat' by Kurtén (1968) but it is unlikely that it spent very much of its waking life in caves. *Myotragus*, as it will be called here, was a bovid that probably belonged to the tribe Rupicaprini within the subfamily Caprinae. If this is so then its nearest European relative would be the chamois, *Rupicapra rupicapra*, that lives on the steep mountain slopes of the Alps and the Pyrenees and eastwards along the mountain chains of Asia.

The excavation of cave sites, in particular that of Muleta by Waldren on Majorca, revealed that this aberrant, highly specialized caprine survived until the Neolithic period, around 2500 BC, and its remains have actually been found intermingled with those of domestic sheep and goats (Kopper & Waldren, 1967). Like many animals that evolve on small islands where there are no predators and an absence of the usual assemblage of competitors for food, *myotragus* diverged very greatly from its mainland ancestors and it must have been a peculiar animal to look at. It was a small ruminant, weighing about 14 kg, that probably had the appearance of a small, squat goat with short, straight, sharply-pointed horns.

Myotragus, like all other bovids, had no upper incisors, but it was unique in that it had only two lower incisors, instead of six, and these were open rooted and continuously growing. These

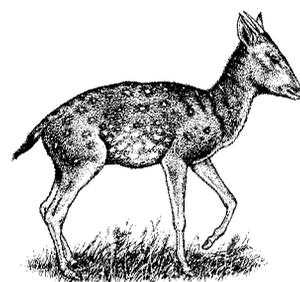


FIGURE 1.8. *Myotragus balearicus*: reconstruction from skeletal evidence.

teeth look rather like the incisors of a beaver, a rodent that is adapted for gnawing bark. It is likely that myotragus fed on the same type of woody plant tissue as the beaver and it may even have used its incisor teeth for stripping the bark off trees, for grass would have been in short supply on the windy, arid, Mediterranean islands during the Pleistocene, as it is now. Another peculiar feature of myotragus was the unusual shortening of its limb bones (Fig. 1.9); in the forelimb the humerus and metacarpal were remarkably short compared to the radius and ulna, whilst in the hind limb the femur and metatarsal were very short compared to the tibia. Moreover the distal tarsal bones, that is the scaphocuboid and the large cuneiform bones, were often fused to the proximal epiphysis of the metatarsal bone. The peculiar proportions of the limb bones were presumably an adaptation that enabled the animals to jump from crag to crag on the steep slopes of the islands. On flat ground they probably moved in a rather slow, stiff-legged kind of way but as there were no predators from which swift flight would be required this did not matter.

When the Neolithic people arrived on the Balearic islands they probably found a population of myotragus that was only controlled by the amount of food available and there may have been very large numbers of these strange-looking 'goats'. They would have provided a ready supply of meat for the humans but at the same time the myotragus would have devoured any grain or plants that were being cultivated. Waldren believes that some attempt was made to corral the animals and even to remove their horns whilst they were alive, that is to poll them for easier management. This may have occurred but it is evident that, in the long term, domestication of myotragus was not successful; this aberrant creature was exterminated and the farmers on the Balearics returned to their ubiquitous sheep and goats.

The gazelles of western Asia

Family Bovidae, Subfamily Antilopinae, Tribe Antelopini

There are three species of gazelle that were common throughout the Near and Middle East until recent times, each inhabiting a particular region or biotope, but also overlapping in their distribution in some areas (Habibi, Abuzinada & Nader, 1997; Figs. 1.10–1.12). The bones, horn cores, and teeth of these gazelles are not easy to tell apart when they are found in a fragmentary state on an archaeological site. In general, however, the smallest species is the dorcas gazelle, *Gazella dorcas*, whose preferred habitat is acacia scrub and semi-desert. Next in size is the

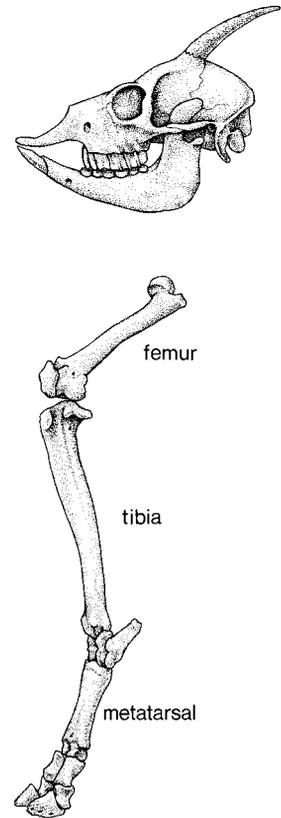


FIGURE 1.9. Skull and left hind limb bones of *Myotragus balearicus*.

Arabian gazelle, *Gazella gazella*, which is found in areas with a rather higher rainfall than the dorcas gazelle and is common in the mountains and foothills of the Arabian peninsula, but not in the central deserts. The largest species is the rhim or goitred gazelle, *Gazella subgutturosa*, which is also more heavily built than either of the other two and is distinguished by differently-shaped horns in the male and by the absence of horns in the female. In the females of the dorcas and Arabian gazelles there are small, sharply-pointed straight horns. The goitred gazelle has the most easterly distribution of the three species and ranges across western Asia into Afghanistan and northern Tibet. It does not leap or bound as much as other gazelles but can run exceedingly fast. The preferred habitat of the goitred gazelle is on steppe lands and semi-desert where dwarf shrubs and annuals are in plentiful supply.

Almost all the Upper Palaeolithic and Natufian (as the Mesolithic of the Near East is termed: see chart, Appendix II) sites of western Asia have provided remains of one or other of the species of gazelle, sometimes in very large numbers indeed. Perhaps the best known of these sites are the Wady el-Mughara caves near Mount Carmel, close to the Mediterranean coast of Israel (Bate, 1937). The two caves of Mugharet-el-Wad and Tabun, excavated in the 1930s, have revealed a long series of rich deposits that are of great importance for archaeology, biology, and biogeography. Within the deposits the numbers of gazelle remains fluctuated greatly and seemed to alternate with those of fallow deer, *Dama mesopotamica*. Bate argued from the relative numbers of these species that the climate must have been hot and dry when gazelle predominated and cooler with a higher rainfall when the remains of fallow deer were in the majority, this being because gazelle normally live in arid open plains country whilst deer are woodland browsers.

Whether or not these deductions were correct, it is sure that gazelle remains greatly outnumbered those of any other animal in the Natufian levels of the excavations. This pattern can also be seen in the faunal assemblages from a number of other sites in western Asia of the pre-Neolithic period and just as Europeans at this period had an economy based on deer, so the people of the Near and Middle East were predominantly hunters of gazelle (Legge & Rowley-Conwy, 1987).

Western Asia is, however, like Europe a very large continental area with a great variety of altitudes and climates so that to claim that one species of mammal predominated over the whole of either region is a facile simplification. Just as people

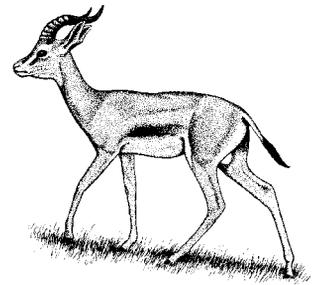


FIGURE 1.10. Dorcas gazelle, *Gazella dorcas*



FIGURE 1.11. Arabian gazelle, *Gazella gazella*



FIGURE 1.12. Goitred gazelle, *Gazella subgutturosa*

living in the mountains of Europe hunted chamois and ibex, so in the highlands of the Near and Middle East they killed wild goats, sheep, and equids for meat. However, it is true that gazelle remains are extraordinarily common on most sites of Upper Palaeolithic, Natufian, and the earliest phase of the pre-pottery Neolithic, as shown for example at Jericho (Fig. 6.11, p. 78). This led some archaeologists (for example Legge, 1972, 1977) to suggest that the gazelles were, if not domesticated, at least managed and herded in a controlled manner. But here again it may have been forgotten how enormously common herds of hoofed mammals were likely to have been on the grasslands of western Asia before humans became fully established as the master predator. When this did occur and meat began to be short, people started to keep a walking larder always to hand, that is they enfolded certain species of animal within their own societies.

Gazelle, like deer, were not amenable to this manipulation. They can be tamed but they cannot be bunched up together or driven with dogs, nor will they travel with nomadic peoples over hundreds of kilometres as will sheep, goats, and cattle. A crucial difference may be mentioned here between sheep and goats, and reindeer and other migrating herd animals: the former can be driven in the direction that the shepherd wishes to go, but with reindeer and indeed gazelles, humans have to follow the herds. The animals can be driven into corrals or for short distances but the course of their migration routes cannot be altered. Mendelsohn (1974) has described, in a quoted translation from a Hebrew writer, the method used by Bedouin for trapping gazelles in a kite and this is repeated here because it is likely that this procedure has been in use for as long as human hunters have lived in western Asia:

In order to trap several hundred gazelles at once, the bedouin enclose a large triangular area which extends over many kilometres. In the wall, which is higher than a man, are places which are lower, and before each one a deep trench is dug. When the bedouin saw a migrating flock of gazelles, they drove them from all directions into the broad opening of the corral. The gazelles were not afraid, as the walls, built from desert stone, were similar to their surroundings. When several hundred gazelles had entered the corral, the bedouin closed in on them, running from left to right, shouting ferociously. Then the frightened gazelles tried to escape, jumping over the wall at the lower parts of it, and fell into the trenches outside of them . . . Then they loaded the gazelles onto their camels, brought them